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Serial No. : 10/680,869
Filed : October 6, 2003
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Attorney's Docket No. 15670-026001

10/680,869

*Entry
Approved
L.R.A. 3/3/05*

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Original) A method for characterizing specimen structure from diffusion anisotropy in magnetic resonance imaging without invoking the diffusion tensor formalism, comprising : collecting a plurality of high-angle resolution diffusion image data employing a diffusion-weighted stimulated echo spiral acquisition process; computing spherical diffusion variance in each voxel by a spherical harmonic transform of the diffusion data; identifying components in a plurality of compartments in the voxel, comprising at least three separate diffusion channels, wherein the diffusion channels are apportioned into direct sum subspaces representing isotropic, single fiber, and multiple fiber components, and wherein asymmetries produced by experimental artifacts fall into other undelineated channels impossible to reach by diffusion, thereby, providing direct means of noise reduction within said diffusion channels, and means for identifying artifactual effects; and determining magnitude and direction of diffusion by computing from the spherical harmonic transform magnitude and phase.

2. (Original) A method for characterizing multi-component magnetic resonance images of multidirectional crossed fibers in